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Avian Migration at Rancho Grande in North-central Venezuela.¹

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(Plate I; Text-figure 1).

[This is one of a series of papers resulting from the 45th and 46th Expeditions of the Department of Tropical Research of the New York Zoological Society, made during 1945 and 1946 under the direction of Dr. William Beebe, with headquarters at Rancho Grande in the National Park of Aragua, Venezuela. The expeditions were made possible through the generous cooperation of the National Government of Venezuela and of the Creole Petroleum Corporation.]

[The characteristics of the research area are in brief as follows: Rancho Grande is located in north-central Venezuela (10° 21' N. Lat., 67° 41' W. Long.), 80 kilometers west of Caracas, at an elevation of 1,100 meters in the undisturbed montane cloud forest which covers this part of the Caribbean range of the Andes. Adjacent ecological zones include seasonal forest, savanna, thorn woodland, cactus scrub, the fresh water lake of Valencia, and various marine littoral zones. The Rancho Grande area is generally subtropical, being uniformly cool and damp throughout the year because of the prevalence of the mountain cloud cap. The dry season extends from January into April. The average humidity during the expeditions, including parts of both wet and dry seasons, was 92.4%; the average temperature during the same period was 18° C; the average annual rainfall over a 5-year period was 174 cm. The flora is marked by an abundance of mosses, ferns and epiphytes of many kinds, as well as a few gigantic trees. For further details, see Beebe & Crane, *Zoologica*, Vol. 32, No. 5, 1947. Unless otherwise stated, the specimens discussed in the present paper were observed or taken in or over the montane cloud forest zone, within a radius of 1 kilometer of Rancho Grande.]

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GENERAL ACCOUNT.

When we first occupied the station at Rancho Grande in north-central Venezuela, we had no idea of the importance of Portachuelo Pass as a migration flyway for birds and insects. Even later on, when we came to compile a list of thirteen apparent life zones within our purview, I added a fourteenth, the Aerial Zone, with hesitation, having in mind the inclusion of organisms such as hummingbirds and mayflies which spend the major part of their life in midair. Almost immediately, however, the value of and need for such a niche in our phenological program became apparent.

If for no other reason, an Aerial Zone was needed to accommodate the volant organisms which passed and repassed, or occasionally were detected soaring high in air, and which were never to be found resting or flying in the jungle of our immediate area of research. Many of these organisms were essentially tropical, occupying our subtropical elevation only as a temporary route of passage.

About two hundred yards north of Rancho Grande is a Pass in the coast range of these eastern Andes. This is Portachuelo Pass, with an elevation of 1,136 meters, about 100 feet higher than Rancho Grande. The shoulders on either side of the Pass rise in sharp ridges to Pico Paraiso on the west, with a height of 1,814 meters, and on the east to Pico Guacamayo with an elevation of 1,900 meters (Text-figure 1). To the south the Valley of Limon leads to the lowlands of Lake Valencia and Maracay, and to the north the deep gorge Valley reaches the Caribbean Sea six miles away at the little village of Ocumare de la Costa, while further west is Turiamo. Other passes exist at a distance in both directions, but this, for some reason, is the dominant flyway for both birds and Lepidoptera. A later paper will deal with the great number of species of butterflies and moths which in season pour through this gap. Hawk Mountain in Pennsylvania would seem to be a similar and equally inexplicable flyway.

During my period of observation I was able to identify with certainty more than



TEXT-FIG. 1. Map showing Rancho Grande in its relation to the Caribbean Sea and Lake Valencia. Portachuelo Pass is just across the road from the black dot marking Rancho Grande.

sixty species of birds which used the Pass, seasonally, daily or irregularly. For purposes of differentiation it was found possible to divide these migrants into ten categories, which seem sufficiently distinct to serve this present purpose. More concentrated observation over longer periods of time would certainly bring about many shifts. Several other factors entered in to make this preliminary list of migrant birds only partly complete, while in addition the numbers must be considered as minimum counts. Among the controlling phenomena were the frequent presence of fog, neblina, wind and rain, combined with the resultant impossibility of nocturnal observation in the Pass. On the other hand, the combination of these factors worked to our advantage at the laboratory itself, by insuring the attracting of many birds to the lights. The birds would frequently strike the glass windows, recover and fly away into the fog and rain. Or they might be injured or

killed, or at least so confused as to allow themselves to be picked up and examined.

One of the agreements made with the Venezuelan Government upon our occupation of Rancho Grande, was that we should respect the law forbidding indiscriminate shooting, in this preserved National Park. Fortunately, most migrants were perfectly satisfactory subjects for sight identification, and many were collected after injury at the laboratory windows. Occasionally I was forced to shoot on the wing, as in the case of the hosts of *Phaeoprogne tapera fusca*, which passed close overhead, day after day, through the thin neblina with the speed of bullets, completely defying even family identification.

Again and again sight identification with the naked eye or seven-power stereos was supplemented by the miraculous lenses of the twelve- and twenty-powered giant binoculars mounted on a tripod. This instrument would bring down a bird soaring high in air, or on

perched in the highest candela tree, to within arm's reach, portraying clearly and distinctly the color of the iris, as well as every individual variation of feather pigment or pattern.

Other rare, almost unknown species, such as *Cypseloides cryptus* and *Neocrex erythrops olivascens* (?) would have wholly escaped record without skins.

If only for the number of individuals and species of North American wood warblers the flyway of Portachuelo Pass would be notable. I recorded thirteen species and Dr. Alexander Wetmore added another not far away. Night after night we heard the chirps of these birds flying over, and on nights of wind and fog the numbers which struck against our laboratory windows gave a hint of the immense flocks which passed unseen and unrecorded by us.

Still another interesting factor is the abundance of migrants through this Pass in connection with its situation at the extreme eastern edge of migration distribution at present recognized in north-central Venezuela. Examples of this are *Mniotilta varia*, *Protonotaria citrea*, *Oporornis agilis* and *Dendroica caerulescens caerulescens*.

In preparation for the long aerial trail of most of the northern migrants, their bodies were bundles of fat with not a particle of super-cargo food in their stomachs. To a less yet decidedly appreciable extent, this was true of certain Venezuelan species of birds which are considered as wholly resident. I believe that when we can band them in sufficient numbers we will find that many tropical Venezuelan birds (corresponding to our northern common crow), which are to be found locally every month in the year, will show considerable individual shifting, north or south, or at least away from their breeding places.

Extremes in non-migratory, permanent residential species are exemplified at Rancho Grande by *Sayornis nigricans angustirostris* and *Thryothorus mysticalis ruficaudatus*, whose territories, at least throughout eight months of two successive years, were bounded by an area of about fifty and about three hundred square meters of jungle respectively.

Dr. Alexander Wetmore, ten years ago (1937), in the course of a short stay in October and November, both at Rancho Grande and Ocumare, made a number of observations on migrants.² The following ten species were not seen by us, and are recorded by Wetmore at Ocumare, between the dates of October 22 to 31, 1937. They are all migrants from the north:

Eastern green heron, *Butorides virescens*

virescens (Linnaeus); blue-winged teal, *Anas discors* (Linnaeus); lesser yellow-legs, *Tringa flavipes* (Gmelin); greater yellow-legs, *Tringa melanoleuca* (Gmelin); western sandpiper, *Ereunetes mauri* Cabanis; Baird's sandpiper, *Erolia bairdii* (Coues); pectoral sandpiper, *Erolia melanotos* (Vieillot); white-rumped sandpiper, *Erolia fuscicollis* (Vieillot); stilt sandpiper, *Micropalama himantopus* (Bonaparte); bobolink, *Dolichonyx oryzivorus* (Linnaeus).

Wetmore's observations on other Ocumare migrants are included in the body of the present paper.

Two additional northern migrants which we did not see are recorded by Wetmore from Rancho Grande:

Dendroica cerulea (Wilson).

Cerulean Warbler.

Wetmore's record reads as follows: "At Rancho Grande in the early morning of November 4, 1937, a dozen or more were feeding actively through the treetops at the house where I was living."

Piranga rubra rubra (Linnaeus).

Summer Tanager.

Wetmore writes: "At Rancho Grande on November 4 one was calling from trees on an open slope at an elevation of 3,400 feet."

The present paper is intended only as a preliminary presentation of the species of birds observed, and their tentative division into a number of types of migration. The bottle-neck of Portachuelo Pass and the constricted area in which northern migrants arrive at and leave the shore at Ocumare, offer a unique opportunity to learn more of many phases of migration in general.

First, the tropical distribution, habits and instincts of the northern migrants concentrated in this area; second, the causes of this particular choice of locality; third, the physical factors of the migration as a whole. A wide and little-known field is the relation of the selection of this particular place to the various theories of migration and migrational navigation; the initiation and development of the boreal pull in these tropics, including the possible effects of neotropical seasons, temperature and light; the visual factors of land, sea, stars, sun, lunar phases, winds and clouds; influence of the vast numbers of birds travelling in close association; possible effects of some radar-like influence and results of recent researches on geographical lines of equal magnetic intensity.

There is also the problem of the relation of the Portachuelo flyway to others in Venezuela, and the concomitant data on other types of migration existing among the resident Venezuelan avifauna. An unexpected phase, correlated with this subject is the contempo-

² Wetmore, Alexander, Observations on the Birds of Northern Venezuela. *Proc. U. S. Nat. Mus.*, 1939, Vol. 87, No. 3073, pp. 173-260.

rary use of the Pass as one of the most remarkable butterfly flyways ever recorded.

A second season of observation with our present appreciation of known and unknown factors should yield valuable data.

In this investigation, as in all phases of my ornithological work in Venezuela, I owe a debt of gratitude to Mr. William H. Phelps and his son, Mr. William H. Phelps Jr., of Caracas, for their constant help and kindness. From his extensive collections Mr. Phelps selected a series of species of birds likely to be found in north-central Venezuela and hence at Rancho Grande. These skins were kept at the laboratory throughout our stay and were of constant use in sight identifications. In the case of skins of uncertain status taken by me, Mr. Phelps made all identifications.

I. SEASONAL MIGRATION.

1. INTERCONTINENTAL MIGRATION.

Under this heading is included all the North American species of birds which spend the winter or dry season in South America, and which we have recorded as using Portachuelo Pass as a flyway on their migration north. After leaving the coast in the vicinity of Ocumare they may turn west and fly up through Central America, or they may choose the more dangerous but direct route across the Caribbean, Cuba and Jamaica, to Florida or the Gulf Coast of the United States. Some may end their long trek in the States or continue to Canada and even Alaska.

In August and September the vanguard of the returning hosts began to appear. Wetmore observed this autumn migration at Ocumare.

Buteo platypterus platypterus (Vieillot).

Broad-winged Hawk.

March 11. A loose flock of sixteen of these well-known birds circled slowly northward through the gap, not very high up, against a fair wind. Three of the birds made passes at one another as they flew. I watched them as long as possible through glasses, and as they continued toward the sea, they spread out into small groups or individuals. The apparent flocking of this rather solitary species may have been due only to the accident of all flying at one time through the bottleneck of the Pass.

Other Records: Wetmore shot three of these birds at Rancho Grande on November 5, 6 and 9.

Pandion haliaetus carolinensis (Gmelin).

Osprey.

June 4. An osprey in full plumage soared northward through the Pass in early morning. Ten days later, on the 14th, a pair of

these birds appeared lower down, but in almost the same part of the heavens, and also headed north. All Venezuelan ospreys are considered to be migrants from the north, but these dates seem very late in the year.

Tringa solitaria solitaria (Wilson).

Solitary Sandpiper.

April 24. Four of these sandpipers were seen running about in the road, at 23rd kilometer, beyond the Pass. I watched them through the glasses as they pursued low-flying insects. They were frightened as a squirrel ran across, they took to wing, and flew straight down the valley toward the Caribbean. The road was still wet from a cloud-burst the night before.

September 9. In early morning after a heavy storm, a solitary sandpiper was found in the road near Portachuelo Pass. It was weak but staggered to its feet, took a few steps and sank down. On my approach the bird evaded me and fluttered down into the dense jungle of the gorge.

Sandpipers are occasionally heard going over at night.

Other Records: Wetmore took a male at Ocumare on October 29.

Actitis macularia (Linnaeus).

Spotted Sandpiper.

March 7. A bird in full spring plumage alighted in the laboratory window at my table for some time, in a light rain among the fluttering moths. When I approached outside, the bird disappeared at once, going up and out into the mist.

Other Records: We have seen this species at Lake Valencia, and Wetmore records several at Ocumare between October 23 and 31.

Coccyzus americanus americanus (Linnaeus).

Yellow-billed Cuckoo.

April 1. I watched one of these cuckoos hopping about a small tree in the Pass in early morning. April 11. A yellow-billed cuckoo and a squirrel cuckoo (*Piaya cayana circe*) were feeding in the same melanostomid bush on the north side of the Pass.

Other Records: Wetmore collected two and observed a third at Ocumare on October 26 and 29, and on November 4 saw one at Rancho Grande.

Nuttallornis borealis (Swainson).

Olive-sided Flycatcher.

From March 23 to April 12 these birds were not uncommon, perched singly, in tall trees along the ridge near Rancho Grande. On April 14, in early morning, a loose flock of birds flew through the Pass. They were frightened by something and two darted down and alighted near me. One was a red-

start, *Septophaga ruticilla*, and the other an olive-sided flycatcher.

Other Records: Wetmore, ten years before, found these birds in exactly the same position along the same trail at Rancho Grande from November 3 to 10.

Hirundo rustica erythrogaster (Boddaert).

Barn Swallow.

On four separate occasions between March 24 and April 7 I saw barn swallows, two, four, one and six in number respectively, flying up the valley or across the road in front of Rancho Grande. Two of these observations were made in early morning from the windows of my bedroom over the laboratory. All the birds were headed or working their way slowly as they fed, northward, toward the Pass a few hundred yards beyond.

Other Records: Wetmore found this species common at Ocumare from October 23 to 31.

Hylocichla minima minima (Lafresnaye).

Gray-cheeked Thrush.

April 22. A male flew against the laboratory windows in late evening in a drizzling fog. It left and returned twice, each time to a different window. I then caught it. No. 30,646, male, excessively fat, weight 36.7 grams, stomach empty. Two others came to the window within the hour but were not caught.

On first comparison with the birds in his collections in Caracas, Mr. Phelps found this specimen confusing, its cold, bright, dark spring plumage was so unlike the dull, more worn plumage of the series in the collection, all of which had been taken in late autumn.

The nearest northern breeding ground of this species would be Newfoundland, twenty-four hundred miles away, while it might continue to north-west Alaska, a full five thousand miles beyond Rancho Grande.

Hylocichla fuscescens fuscescens (Stephens).

Veery Thrush.

April 19. A female flew against the laboratory windows and was captured. No. 30,632. It was exceedingly fat and in the stomach was only a single, large, amber berry. No other veery was recorded.

Vireo olivaceus olivaceus (Vieillot).

Northern Red-eyed Vireo.

Four individuals recorded; No. 30,377, female, April 8, 1945, taken at electric light in rain at Bodega near Rancho Grande by Pedro. Very fat, no food. April 9, 1945, a live bird handled and compared with above specimen and two in Phelps's collection. Identical in lack of yellow on under tail-coverts and along rectrice edges.

April 6, 1946. Two caught against win-

dows. Typical northern red-eyes with whitish under tail-coverts and rectrice edges.

Vireo altiloquus altiloquus (Vieillot).

Caribbean Vireo.

On April 19 a Caribbean vireo flew against the window of the laboratory and was caught. No. 30,633, female, not breeding, very fat, weight 21.6 grams, a small chrysomelid beetle in stomach. Later in the evening two more vireos flew against the window in my bedroom and escaped. I examined them closely through the glass with my face only six inches away and the facial buffy color was very apparent.

If they were headed north their probable goal would be Haiti or Porto Rico.

Mniotilta varia (Linnaeus).

Black-and-White Warbler.

On March 10 I watched a pair of these warblers for some time on Water Trail. They were high up, creeping over the bark of a candela tree. Two days later, March 12, another creeping warbler was busily feeding in a low melanostomid bush near the road beyond the Pass. It flew at once and disappeared down the valley.

Other Records: Wetmore collected this species at Rancho Grande on November 3 and 8.

These records would seem to be near the easternmost limit of the bird's winter quarters in northwestern South America.

Protonotaria citrea (Boddaert).

Prothonotary Warbler.

On March 7, at 9:15 in the evening, a full-plumaged male flew about and alighted on the orchids and monstera near the entrance of the porch at Rancho Grande. An hour later the same or another individual perched for several minutes in a laboratory window in company with a male redstart.

On September 6 two were plainly seen in a small flock containing at least four redstarts. These were near the road beyond the Pass.

Remarks: Not until I reached Caracas and talked with Mr. Phelps did I realize that this species is considered rare in Venezuela, and about at its eastern limits. In the Santa Marta region to the west Todd-Carriker³ records it as "One of the most abundant of the winter resident warblers within its local habitat, which is never far from the sea-beach, or water of some kind."

Vermivora chrysoptera (Linnaeus).

Golden-winged Warbler.

Near the road on March 11, insect hunting in a small tree, a beautiful golden-winged

³ Todd, W. E. Clyde and M. A. Carriker, Jr. The Birds of the Santa Marta Region of Colombia, *Annals Carnegie Museum*, XIV, 1922, pp. 3-582.

warbler came within six feet of where we stood, too close even for binocular focus. It turned upside-down, sideways and around, doing everything it could to impress every character. The throat and upper breast were washed faintly with pearly gray.

(I never gave up hope of seeing a Tennessee Warbler (*V. peregrina*) but none came, at least within identifiable distance.)

***Dendroica petechia aestiva* (Gmelin).**

Northern Yellow Warbler.

These birds are not uncommon in the lowlands, and I observed them several times both at Maracay and Ocumare.

Only once, on April 8, did I see this species at the altitude of Rancho Grande. Five were feeding in a small tree across the road from the laboratory, in early morning, in thin neblina. The night had been windy and with a strong drizzle.

Other Records: Wetmore took a male at Maracay on October 21.

***Dendroica caerulescens caerulescens* (Gmelin).**

Black-throated Blue Warbler.

About 11:30 on the night of April 21 an unmistakable male in full plumage struck against and clung to one of my bedroom windows. I went over and watched it in the brilliant electric light. It held its precarious position for about two minutes in spite of being buffeted by a cloud of moths. It then disappeared into the wind and pouring rain. Within five minutes a female redstart had taken its place. I went down and turned on the laboratory lights but it did not reappear, and the following morning an hour's search of the vicinity of the Rancho revealed no other individual.

Other Records: Wetmore observed one at close range at Ocumare on October 27.

***Dendroica fusca* (P.L.S. Muller).**

Blackburnian Warbler.

On the evening of April 21, two male blackburnians flew at the same time against the glass of two separate windows of the laboratory, one near my table, the other at the far end of the room. Both males remained for a short time but disappeared into the fog before we could reach them from the outside.

The next evening April 22, a third male flew and fluttered for a few seconds against a window of my bedroom.

***Dendroica castanea* (Wilson).**

Bay-breasted Warbler.

A male of this familiar species flew against the window of my bedroom in the evening of April 22, about an hour after the visit of the blackburnian. This bird struck twice, flew off into the darkness and fog, and re-

turned twice, once clinging to the frame, fluttering there for some time, then hanging back exhausted. Every marking was perfectly distinct. These windows are twenty feet from the ground and the laboratory lights below were still on.

***Dendroica striata* (Forster).**

Blackpoll Warbler.

This was by far the commonest of the migrant North American warblers at Rancho Grande. Between fifty and sixty individuals were observed between April 21 and May 5, the peak being on the 22nd, when forty-two were seen or caught and liberated in the single evening. The dates in April when birds struck against the windows were 21, 22, 25, 28, 29 and 30, and these were exactly these evenings which we marked in our weather records as characterized by "fog, wind and rain."

The ratio of sexes on one night was 25 males to 9 females. Only four birds out of the entire total were injured or killed, two of which I skinned, No. 30,641, male, weight 17.5 grams, April 21; No. 30,642, female, weight 18 grams, April 21. All birds examined were excessively fat, all the body organs being encased, and the stomachs were empty.

I have a record of 14 grams for a blackpoll taken in mid-winter in British Guiana. So if we accept this as normal weight, the 18-gram Rancho Grande individual has added more than one-quarter to its weight in fuel for its trans-Caribbean flight.

Unlike most of the other warblers these sat quietly in the windows among the masses of fluttering moths of all sizes. One male remained for a full hour and allowed Miss Crane to set up an elaborate apparatus and take a flood-light photograph. (Plate I).

Only once, on April 29, did I observe a blackpoll in daytime. This bird was hopping slowly about a bush across the road.

Other Records: Wetmore recorded blackpolls at Rancho Grande on November 5, 6 and 7, and at Ocumare on October 25, 26 and 27.

***Selurus aurocapillus aurocapillus* (Linnaeus).**

Ovenbird.

April 19. An ovenbird was observed walking about on the ground, apparently searching for food, under a guava tree in front of Rancho Grande. It was very tame, allowing Miss Crane, Mr. Fleming and myself to approach closely.

April 22. A second and a third ovenbird flew against the laboratory windows about 9 p.m., three days after we had watched the first individual. They remained among the moths for some time, the light orange head patches showing up clearly. Later, on the same evening, a northern water-thrush struck with such force that it was killed.

At the time of observation we had no idea that the ovenbird was a rare visitor to Venezuela.

Other Records: The ovenbird has been recorded once from Santa Marta to the west, and once from the Paraguana Peninsula in Venezuela.

Seiurus noveboracensis noveboracensis
(Vieillot).

Northern Water-thrush.

April 21. A quick glimpse of a small bird walking about the porch of Rancho Grande in the electric light left me convinced that it was this species, but it may have been an ovenbird.

April 22. A male water-thrush flew against a laboratory window with such force that it was killed and later picked up from the ground below. It was excessively fat with a completely empty stomach. No. 30,647, weight 22 grams.

Oporornis agilis (Wilson).

Connecticut Warbler.

April 29. The only certain identification of this species was a male captured and skinned after it flew against a window of the Rancho Grande laboratory. As usual with migrants, its body was encased in fat, and the stomach contained no food. No. 30,668, weight 19.8 grams.

On the same and several succeeding days there were flocks of small, dull-colored warblers which may well have been of this species but which were too high up in the dark shade of jungle trees for identification.

May 2. A full-plumaged male fed within a few feet of us in a low tree near the Pass for as long as we wished to watch.

Other Records: Wetmore collected a migrating male at Ocumare on October 23.

Oporornis philladelphia (Wilson).

Mourning Warbler.

April 9. Three birds, all males, fed in the undergrowth near the road beyond the Pass. They seemed tired, perhaps after battling through the neblina and high wind of the past night. They paid no attention to us even when we approached within six feet. To our amazement one of them uttered its song, faint but almost complete, reminiscent of, yet quite different from the song of the ovenbird. One bird had a faint, imperfect eye ring but the jet black breast of the present species was unmistakable.

Setophaga ruticilla (Linnaeus).

American Redstart.

Next to blackpolls, this warbler was the most abundant of Rancho Grande migrants.

February 27 was the earliest date it was observed, and until May 5 at irregular in-

tervals they could be seen feeding with other small birds during the day. On nights of fog, rain or wind they struck against the laboratory windows. The females outnumbered the males about two to one. All these skinned were coated with fat. For example, No. 30,626, female, weight 10.3 grams; No. 30,630, male, weight 11 grams.

Fall migrants returning from the north were recorded as follows: August 31, male in tree; September 6, 7 and 8, respectively four males, two males, two females, all feeding along the Pass trail with other warblers and tanagers.

Other Records: Wetmore saw redstarts at Maracay on October 21 and November 11; at Ocumare on October 23, 29 and 30.

2. CONTINENTAL MIGRATION, SOUTH.

This division includes only a single species, whose appearance was so unexpected and extensive that full details are recorded. It is well known that these southern brown-breasted martins mingle in the dry season with those from northern regions, but I do not know of any consistent or regular migration of great numbers having been recorded before. I can offer no reason for the time or direction of the flight.

Phaeoprogne tapera fusca (Vieillot).

Southern Brown-breasted Martin.

These birds from southern and central parts of South America were first seen migrating north through Portachuelo Pass on July 28. For several days their speed and the presence of heavy fog prevented identification. Both Mr. Tee-Van and I at first thought they were plovers. On August 2 I shot three birds. Their impetus carried two of these far over the Pass and into the heart of the valley jungle. The third fell almost at my feet and proved to be a male *Phaeoprogne tapera fusca*. The identification was made by William H. Phelps after comparison with his large series of *t. tapera* and *t. fusca*. A few days later, by sheer accident, at one side of the Gorge Trail, I came across one of the shot martins which had over-passed me. It was badly decomposed and almost buried by scarab beetles, but the characteristic line of mid-breast, dark-brown spots was still unmistakable.

The migration was unified and continuous, extending at least from July 28 to August 31. In the daytime it was sharply limited from four or five in the afternoon until it was too dark for us to see. Without exception every bird was headed north through the Pass.

The following is a brief résumé of my notes:

July 28. Together with swifts, a number of brown plover-like birds were seen passing north through the Pass.

July 29. For an hour, from 4 to 5 P.M. John Tee-Van and I watched more than one thousand of these birds (1,071 were actually counted) fly past. At terrific speed the birds appeared and disappeared out of and into the dense fog, giving us only a momentary glimpse. They came singly or in groups. There was no diminution in numbers when we left at 5 P.M.

July 30. The birds began passing in heavy fog at 4 o'clock. Counted 341 and missed a great many before it began to rain.

August 1. From 5 o'clock to 5:45 two of us counted considerably more than 5,000 birds all going north. The weather was clear and many of the martins were passing very high up, flying straight and strongly. With them were numbers of *Chaeturella rutila brunni-torques* and *Streptoprocne zonaris albicincta* whose speed was somewhat less than that of the martins.

August 2. Shot three birds in dense neblina. The martins passed with no let-up from 4:30 until dark. One of us counted 4,860. The shot bird was a male, No. 30,912, not very fat, weight 36 grams. Its food consisted of a dragonfly (Aeschnidae), several small beetles, besides a neuropteran and a homopteran. Almost no signs of molt, except the half-grown first primary of each wing.

August 7. The martins began passing at 4:55 P.M. Within the next twenty minutes counted 985, missing as many more. They were flying low through the Pass, below tree-top level. Circumstances precluded observations during succeeding eight days.

August 16. Martins appeared at 5:10 P.M. and in constantly increasing numbers until 5:45. My total was 3,910. There was dense neblina in the valley on the north side, and at first the birds came over in mid-Pass and plunged headlong into the solid fog, vanishing at once. Later, as the fog drifted up toward the Pass, the migrants swerved out over the road, curving low over and through bushes and trees.

August 31. For two weeks I was away from Rancho Grande, lecturing in other parts of the country, and for the intervening time had to depend on the scanty notes of a native assistant. He reported that on at least eight of the fourteen days martins were seen going over. On August 22 a very large number passed through.

Today (August 31) on my return, the martins appeared as usual at 4:45 P.M. and in a half hour 776 were counted as they went easily with the wind, always northward. This completes my observations, as no more birds were seen on succeeding days.

The presence of this southern form at Rancho Grande is not without precedent, for Hellmayr gives as its range: "Breeding in northern Argentina, Uruguay, Paraguay, eastern Bolivia and southern Brazil, north to

Matto Grosso, Goyaz and Minas Geraes spreading in winter north to British Guiana, Venezuela, Amazonia and Colombia."⁴

Mr. Phelps has birds in his collection from Lake Valencia, Ocumare, Puerto Cabello and Carenero, Miranda. Dr. Niceforo lists several Colombian records, including one near Bogota at an altitude of 2,600 meters.

What awaits explanation is: Why should a minimum of seventeen thousand southern martins be flying north, at this season, in a definite temporal and spatial migration headed for the Caribbean Sea only a few kilometers away?

Did they swerve east or west after they vanished from sight into the fog?

Why do they not fly, like *Progne chalybeata*, during the day, and how far into the night does the flight continue?

When and by what route do these birds return to the Argentine and other breeding haunts to nest in November and December?

3. MIGRATION OF BREEDING RESIDENTS.

With more extended, concentrated observation, this section could, of course, be very greatly increased. It would account for the lessening in numbers or disappearance after the breeding season, of resident birds. I have included only three species, all of which were observed utilizing the Pass as a flyway.

Pygochelidon cyanoleuca cyanoleuca (Vieillot)

Blue-and-white Swallow.

Together with house wrens, these swallows were our constant familiars at Rancho Grande, breeding in numbers in the drain openings and crevices of the unfinished walls. On February 22 there were only twelve birds present, all roosting together in the most distant, upper doorless rooms. By the time breeding had begun the flock became three times as large. After the second brood was reared the number of the swallows gradually decreased. As to their return, Wetmore records this same colony as present in small numbers in early November.

My inclusion of the species in Pass migration rests upon two flocks, seen on July 16 and August 4, of sixty and thirty-four birds respectively, which flew slowly, well up, southward through the Pass. The second flock was accompanied by a few rough-wings and short-tailed swifts. They were not feeding and very definitely were not from our colony which was still present in strength.

Stelgidopteryx ruficollis aequalis (Bangs).

Caribbean Rough-winged Swallow.

Only three pairs bred at Rancho Grande, in complete amity with *Pygochelidon*. They

⁴ Hellmayr, Charles E., Catalogue of Birds of the Americas, *Field Museum of Natural History, Zoological Series* XIII, Part VIII, 1935, p. 29.

have but one brood and disappear as soon as the young are well-grown. My more definite inclusion of the species as migrants is the certain identification of five rough-wings in company with a southward-headed flock of *Pygochelidon* on August 4.

Other Records: Wetmore secured two females near Rancho Grande on November 3 and 9. One of the birds was in full wing molt. At lower elevations, from October 22 to November 10 he observed these birds near holes in banks, but no definite proof of their breeding at this season was obtained.

***Platycichla flavipes venezuelensis* (Sharpe).**

Venezuela Gray-backed Robin.

***Platycichla leucops* (Taczanowski).**

Black Robin.

So far as migration data are concerned, our notes on both of these birds are identical. In 1945 both gray-backed and black robins were not uncommon, and from the actions of pairs of birds they seemed to be nesting in several places in Gorge Valley on the north side of the Pass and bordering the trail leading up to Pico Paraiso to the west. On August 16 we saw a flock of twenty-four birds, about one-third of which were black. They flew up from the Limon Valley toward us, and on through the Pass in a long drawn out, narrow line several birds in width, on and into thin neblina on the Caribbean side. Two days later on August 18 a pair of birds, both black, flew through the Pass in the same direction.

Learning of the uncertain specific status of these two color-patterned robins, I kept close watch in 1946, but throughout five months I neither saw nor heard a single bird. The song is very characteristic and cannot be confused with that of any other species.

4. LOCAL FLOCKING OF PERMANENT RESIDENTS.

The gathering together of a few or of many species of birds into definite flocks, occurring after the breeding season, is one of the commonest avian phenomena in tropical jungles. The wanderings of these flocks are irregular, and seem to follow no definite routes, but, at least near Rancho Grande, are usually restricted to territory embodied within a few square kilometers. A traverse of the east and west ridges forming Portachuelo Pass was a path occasionally followed by these flocks, and their passage was so leisurely and the birds so tame that a reasonably complete census was often possible. Now and then it seemed certain that the same flock reoccurred several times with about two weeks intervening. Identity seemed certain, for example, as in one case in which the members included exactly twenty-nine *Tangara arthrus arthrus*

Some flocks were composed solely of two or three species of larger birds, such as caciques, toucanets and green jays, but most of them embraced a heterogeneous assembly of perhaps a dozen species of small birds, a mingling of woodhewers, tanagers, honey creepers and antbirds.

Members of these groups seem bound together by something more than casual association, for more than once I have seen two flocks progressing in different directions, meet, cross, and emerge with identity unbroken, and respective components unaffected by the temporary warp and woof of crossing.

The cause of this flocking is uncertain. The birds are always busy searching for food or feeding, yet there is no stirring up of insect life as with the followers of army ants. As to mutual protection, the resultant increase of sight and sound would seem disadvantageously to advertise their presence to predators. I have omitted any detailed list of species included in this section as being too casual in their use of the Pass.

5. LOWLAND TO LOWLAND MIGRATION OF NON-RESIDENTS.

In this division I have placed the few species of birds which at least once have definitely used Portachuelo Pass as a migration flyway after their breeding season. Their numbers, as well as their direction, together with the fact that all are non-residents, mark them definitely as migrants.

That there is no bond between them except this tenuous habit may be perceived from the fact that four are raptorial birds, one a goatsucker, one a martin and one an oriole.

***Elanoides forficatus yetapa* (Bonn. and Vieillot).**

Swallow-tailed Kite.

Twice, in June, we saw individual kites hovering over the distant jungle of Limon Valley in front of Rancho Grande, searching for lizards or grasshoppers. In both cases the birds moved away without finding food. On August 15 at 2 P.M., in full sunshine, nine of these lovely birds circled slowly, well up, over the valley and then moved northward through the Pass. Two of us and two visitors watched them until they were out of sight. Two hours after they disappeared fog and rain settled down.

At the height at which they were circling they could easily have passed over Pico Paraiso, but like so many other creatures, both birds and butterflies, the exact center of the Pass drew them like a magnet. A very enlightening simile would appear to be Hawk Mountain in Pennsylvania, with its amazing numbers of species and individual raptors, where the reason for the concentration of

spatial migration seems as nebulous as that of Portachuelo Pass.

These essentially tropical swallow-tailed kites were never seen to return, so I can classify their passage only as a seasonal, post-breeding shift to new areas.

Harpia harpyja (Linnaeus).

Harpy Eagle.

We had no expectation of seeing harpy eagles near Rancho Grande. The last I had observed were at sea-level in British Guiana, and as far as I know, they have never been associated with migration in any form. Although their general distribution is given as "Mexico from the Isthmus of Tehuantepec south to Bolivia, southern Brazil, Paraguay and northeastern Argentina," few people within these boundaries have ever caught a glimpse of one of these eagles. They are essentially tropical, solitary, and their usual haunts are the jungles whence they obtain their favorite prey of sloths and monkeys. These birds have not, I believe, been recorded from northern Colombia or northwestern Venezuela, and there are only a few, scattered records for all of Venezuela.

During our stay at Rancho Grande, on two separate occasions, harpy eagles presented perfect opportunities for deliberate observation and identification. The first bird was seen early in the morning of August 2, 1945, after a night of rain and wind. This fully adult eagle was perched in a dead tree part way up Limon Valley. When it flew, it flapped heavily up the valley and on through the Pass to the north. A half-mile away one of my staff saw and described what was apparently the same bird as it flew on down the valley on the north side.

In the following year on August 7 in the afternoon at the Pass, a hint of something unusual was evident by the sudden terror of several passing flocks of giant swifts and conures, which in their alarm, dashed past, very low, close to where I sat. Soon after this excitement four harpy eagles soared fairly high over the Pass. One was in white immature plumage, three were adults. After these had disappeared from view, another pair of eagles came into sight. All were moving swiftly, but in narrow circles or spirals, which kept them in full view for a considerable time. With number seven binoculars, elbows steadied on knees, I could make out every detail of pattern and color, from the occasionally raised crest to the great yellow feet. This August day was one of the most memorable at the Pass.

The birds worked northward until they were out of sight. They were not graceful birds, but, in what must have been an upsurge of air, they soared as effortlessly as the frigatebird which later appeared high above

them. Day by day, month after month, watching of the Pass yielded no more harpy eagles and two excited reports by staff members were without binocular confirmation.

Beyond the fact that on the seventh of August six harpies went north through the Pass, we are completely ignorant. It seems almost impossible that they could remain unnoticed on their further travels, but whence they came and whither they went, bound, we cannot even guess.

Falco albogularis albogularis (Daudin).

Bat Falcon.

We recorded this species on two occasions once as real migrants. On July 6, I discovered one perched in the top of a candela tree at the gate of Rancho Grande and watched it for a whole hour, using 12 and 20 powers of the giant binoculars. It took flight twice circled and returned. Then, unexpectedly six more bat falcons appeared from somewhere to the south and circled overhead working toward the Pass. As they went, my bird, with a loud chattering, joined them and all disappeared northward through the gap. I saw no other bird of this species until August 4, when a single falcon drifted slowly high up, disappearing into thin clouds before I could be sure of its general direction.

In spite of the lone perching bird, this species seems to be essentially tropical and only a casual visitor and migrant at Rancho Grande altitudes.

Milvago chimachima cordatus (Bangs and Penard).

Chimachima Hawk.

The chimachima was occasionally seen in the vicinity of Rancho Grande, but it is predominantly a resident of the lowlands. Several were killed by passing cars near the upper level and close to Portachuelo Pass and I saw one with a large and very lively coral snake in its claws directly over the laboratory.

My inclusion of the species here is due to eight of these hawks circling slowly, low down, headed northward through the Pass which classifies them as non-residents, lowland to lowland transient migrants.

Other Records: Wetmore records this species as found in small numbers at Ocumare and fairly common at Maracay.

Nyctidromus albigollis albigollis (Gmelin).

Parauque.

I was surprised to flush two of these old friends on the road in front of Rancho Grande on an evening in early May. Later on May 10, we saw another nighthawk and a week later a pair close to the Pass. In Limon where the rise to Rancho Grande begins

these birds could often be flushed in the evening.

Their inclusion here is because of sixteen parauques circling slowly over and through Portachuelo Pass, headed southward, on April 16. I watched them as long as possible through glasses and not a bird caught an insect. They were moving leisurely, in a single flock, from somewhere along the coast to somewhere in the interior.

Other Records: Wetmore saw these birds at Ocumare on October 30.

Progne chalybea chalybea (Gmelin).

White-breasted Martin.

This widely distributed swallow was common and nesting at Turiamo, Ocumare and Maracay. In early morning from the porch of the Hotel Jardin in Maracay, hundreds of these martins could be seen quartering the sky, feeding on clouds of gnats. I never saw a single bird at Rancho Grande until, on July 18, a mass migration began from the north. From 8:15 to 9:15 in the morning, small and large flocks of martins poured through Portachuelo Pass, coming from the northern valleys and concentrating into the narrow gap. We counted 1,246 in all and must have missed at least as many more. One flock contained more than 300, and at other times small groups of seven to ten would straggle past. A fairly stiff wind kept the birds twisting and bucking, and now and then they would be held stationary for a few seconds before they could again regain impetus. None were feeding.

On July 23, two large and one small flock came through, a total of at least 643. On two preceding days and for three succeeding ones, more of this species were reported, but I did not see them. On our next visit to Turiamo, only a few individuals were visible. Until August 10 the martins at Maracay seemed undiminished, but after that date fewer were noted, although our observations were confined to early morning and late afternoon.

The fact that Wetmore in November did not record this species from either Ocumare or Maracay would indicate that the migration must be continued farther to the south, and that it lasts at least from mid-July to November.

Cacicus cela cela (Linnaeus).

Yellow-rumped Cacique.

This tropical species was recorded at Rancho Grande only as a migrant. On July 20 a compact flock of 37 caciques came south through Portachuelo Pass, and again on the 24th fourteen more birds followed the same route, with two additional stragglers striving to catch up.

On our next visit to Turiamo the two low-

land colonies near the road were still occupied, so the migrating flocks must have originated further east or west. No return was noticed during our stay.

II. DAILY MIGRATION.

6. REGULAR LOWLAND TO LOWLAND MIGRATION OF NON-RESIDENTS.

We include only black vulture under this heading, but in spite of our watching, there may be a few others which use the Pass as a daily or at least a regular highway to and fro, from sleeping to feeding grounds and return.

Coragyps atratus (Beckstein).

Black Vulture.

Early on the morning of our second day of arrival at Rancho Grande I recorded eleven of these vultures flying low against a light wind, headed north through the Pass. After a few days I gave up continuing such records. Except on days of heavy storm or solid fog, from 11 to 36 vultures flapped up the valley from Maracay through the Pass and on out of sight. In the afternoon, in the van of the incoming fog or neblina, they returned singly or en masse.

I never saw one turn aside, circle, soar or slacken its directed speed. It was a most regular, daily migration from lowland to lowland. Again and again, while intent on some observation, the sudden *whoof! whoof!* beat of wings would attract my attention up to the passing vultures. This bird was the most perfect justification of Rancho Grande Number 14, Aerial Zone.

7. IRREGULAR, DAILY SHUTTTLING.

This section includes most of the parrots and swifts. The majority of the species of these groups are present near Rancho Grande as rare to fairly common residents, but our memory of them is chiefly as flocks passing back and forth through Portachuelo Pass. Excluding *Cypseloides cryptus*, four species of swifts come under this heading. The irregularity of these movements prevents any classification of objectives, such as feeding, roosting or breeding. From the beginning to the end of our stay these birds were observable in flocks.

Aratinga wagleri transilis (Peters).

Red-crowned Green Conure.

This was the most abundant of its family at Rancho Grande, its raucous screeching audible several times a day. Its presence in this list is due to its eternal flying back and forth, north and south through the Pass, in smaller or larger flocks, the members always in multiples of two. In both clear sun and fairly dense fog these irregular local move-

ments kept up. The beginning and end of the shifts were usually beyond our view.

***Pyrrhura haematotis haematotis* (Souance).**

Red-eared Conure.

This conure was not uncommon and was often seen passing through the gap. The tail was the best identification character when seen against green foliage. A bird secured from a flock of twelve on May 21 was a female, not breeding, No. 30,711, weight 66 grams. The stomach was full of reddish fruit. A half-eaten individual found on a trail had put up such a stout fight with its assailant that sufficient feathers were scattered around to identify the attacker as *Otus choliba crucigerus*.

***Forpus passerinus viridissimus* (Lafresnaye).**

Green Dwarf Parakeet.

This is essentially a lowland bird but I have five records for Rancho Grande. Three of these were of flocks going through the Pass, north, south and north respectively, of 6, 16 and 8 birds. The dates were February 28, March 3 and 7. On two days these parakeets were seen feeding in a berry tree directly opposite the laboratory, the last time in company with *Pionus sordidus*. The twenty-power giant binoculars showed every feather.

We saw dwarf parakeets both at Turiamo and Maracay and Wetmore recorded them at Ocumare.

***Amazona ochrocephala ochrocephala* (Gmelin).**

Yellow-fronted Amazon.

A single feather picked up in the road indicated this species. On April 6 two flocks of 6 and 8 birds went north through the Pass. After this, from time to time, small flocks in pairs vibrated back and forth, irregularly. On two occasions single birds perched within easy range of the giant binoculars.

***Pionus sordidus sordidus* (Linnaeus).**

Black-headed Amazon.

In pairs and small flocks these parrots occasionally fed near by and seemed to be real residents of the subtropical area around Rancho Grande. But more frequently they were seen going through the Pass. Several flocks would appear from the south and fly directly through and on into the north valley. Then at noon, or later, these or others would return, or they might come into view, wheel and turn back on their tracks. Their *peeunt* often called attention to the 4 to 10 birds which usually composed the groups, even before they came in sight. They were recorded every month of our stay.

The one exceptional migratory flight, on March 11, was a compact flock of at least 96 individual parrots. We were several kilo-

meters down the road toward Maracay when we sighted the birds, flying low, silhouetted against the jungle, and headed straight up the valley toward the Pass.

***Touit batavica* (Boddaert).**

Seven-colored Parakeet.

On June 25 in the road near Rancho Grande I found several small green feathers together with a single lateral tail feather. The latter instantly brought to mind the name *Touit batavica* and a memory of the exquisite little parrot to which it belonged and which I had last seen many years ago in British Guiana. Mr. Phelps later confirmed the identification. No other bird's feather had the wonderful changing purplish-pink with the black tip of this rectrice.

This parakeet would seem to be an inhabitant of lowland tropics. The only other record for Rancho Grande is a flock of four which came down the valley from the north, and at the Pass alighted in a cecropia. I had already focussed the 12-power of the giant glasses on a tanager in the same tree, so required only a slight lateral shift of the two-foot binocular tubes to bring into perfect focus three of the quartet of seven-colored birds with all their beauty of yellow, black, green, blue, rose and purple. Before long they took to wing and swung swiftly on their way toward the lowlands of Maracay.

***Streptoprocne zonaris albicincta* (Cabanis).**

Giant White-collared Swift.

Soon after our arrival I ceased keeping an exact count of these splendid birds, for they seemed no regularity in their movement. During clear days they might occasionally be seen hawking with our swallows or other swifts high in air. Aside from this they were recorded chiefly as dashing back and forth through Portachuelo Pass. For example on June 24, four, and then sixteen birds, drove southward in separate flocks toward Maracay. At 3 P.M., just before the fog rolled up a loose flock of 64 rushed past, low, northward.

At nine o'clock on the night of July 3, 1942 two giant swifts, in dense neblina, killed themselves against the laboratory window. No. 30,447 weighed 105.8 grams; and No. 30,452, 96 grams. Both were adult males, but the white pectoral band in the latter bird was so narrow and faint as to be almost absent. Their crops and stomachs were crammed with flying ants.

The first swift (No. 30,447) had eaten hundreds of a pure culture of winged female *Azteca* ants. The second bird (No. 30,452) had dined on equally large numbers but of greater variety, including ants of the genera *Dolichoderus*, *Solenopsis* and *Crematogaster*. The absence of all mutual species of ants

the two birds might indicate that, although they arrived at the laboratory simultaneously, they may have been quite dissociated in feeding locale.

Other Records: Wetmore observed these birds at Rancho Grande on November 3, 6 and 10.

***Chaeturella rutila brunntorques* (Lafresnaye).**

Chestnut-collared Swift.

In abundance this swift ranks as third. An irregular Pass migration versus feeding within sight of Rancho Grande, the proportion is about ten times to one. It lives in small flocks, never more than twelve, and often single birds are seen hawking about with the swallows. Except with the giant binoculars, these birds are more easily identified when silhouetted against the green foliage than when high in air.

In 1945 seven birds struck against the laboratory windows, all on nights of rain and fog. Two of these chestnut-collared swifts were caught. No. 30,382, May 14, male. This bird struck among a fluttering mass of hundreds of moths and was instantly killed. The collar was very wide and bright rufous. The bird weighed 25 grams. The food consisted of several hundred flying female *Camponotus* and *Solenopsis* ants. This was the very first evening when the electric lights were operating. No. 30,448, July 3, male, weight 22.9 grams. Collar was one-half normal width on nape, and almost absent on breast. Food, many *Crematogaster* ants.

***Chaetura brachyura brachyura* (Jardine).**

Short-tailed Swift.

This was the commonest swift to be seen at Rancho Grande. On clear days, numbers often fed with the swallows, whereas on partly cloudy days or when fog threatened to drive up one or the other valley, these birds shot through the Pass in numbers. They were equally in large, loose flocks, or small compact groups. We saw this swift every month of our stay, and often daily.

Other Records: Wetmore recorded this species at Rancho Grande November 4.

8. TEMPORARY, DAILY, LOCAL MIGRATION.

Only one species was observed which fitted into this category. When we know more about the ecology and life habits of tropical jungle birds we will be able to write more intelligently of these incipient migrations.

***Psarocolius angustifrons oleagineus* (Sclater).**

Green Cacique.

In the course of watching the inception of one unit of a five-tree colony of green cacias within sight of Rancho Grande, it became evident that a temporary daily migra-

tion was going on. From the time of the first woven attachment of the great nests until final completion, the polygamous male and his whole harem of females would leave simultaneously, late every afternoon, and fly in the direction of Portachuelo Pass. Several times, when we were returning, this flock passed up, flying low through the Pass. The birds evidently stopped somewhere in the heart of Gorge Valley for we could continue to hear their noisy chatter. Early next morning all would be back at work, the females laboring to complete their nests and the male encouraging them with song and courtship acrobatics.

This routine migration ceased with the laying of the eggs, and when most of the nests were finished and occupied, the male would start on the five o'clock trek accompanied by only two or three females. Local and transient as this movement was, it presented a regular sequence, extending from the tree of unfinished nests of the colony to some relatively distant and definite feeding or sleeping place, and back again.

Migratorially this cacique offered another interesting phase, for when the young were fledged and able to care for themselves, the whole colony joined with green jays or toucanets, to form one of the many wandering flocks (Section 4).

III. IRREGULAR MIGRATION (AS OPPOSED TO SEASONAL AND DAILY).

9. IRREGULAR MIGRATION OF NON-RESIDENTS.

This section includes a number of species whose migration must be called sporadic. The association is in part a confession of ignorance, but for the present, logical.

The several lowland wading birds included, drift irregularly back and forth from Ocumare and Turiamo through the Pass to Maracay, in family groups or singly, with little reference to the breeding season. The remainder represent mostly a single nocturnal visit to laboratory windows and must be sequestered here until we know more about the reason for their unseasonable and nocturnal appearances.

***Leucophoyx thula thula* (Molina).**

Snowy Egret.

This is a familiar bird of the lowlands and I saw it again and again at Turiamo, Ocumare and Lake Valencia. On March 3 seven birds flew northward through the Pass, and three more on March 6. On July 29 four egrets appeared suddenly in early morning, beating their way south, low, through the light neblina.

These seemed rather casual small flocks, shifting from one bit of water to another; more week-end visitors than migrants.

***Neocrex erythrops olivascens* Chubb (?)**.

Red-faced Rail.

Six of these rails flew against the laboratory windows at Rancho Grande, and two were caught, skinned, and presented to Mr. Phelps when it was evident that they were of exceptional interest. Seventeen more were seen early one morning flying south through Portachuelo Pass.

Mr. Phelps has personally compared these two specimens with the 31 known specimens of the species in the American museums. He sent a specimen of *olivascens* from Caracas to Dr. Kinnear of the British Museum, who compared it with the 8 specimens of the species there. The result of these comparisons is that the Rancho Grande specimens are much brighter than all the others: the forehead is purer, brighter bluish-gray; the chin and throat are pure white instead of dirty white; breast and abdomen brighter bluish. Phelps believes that there is a possibility that the Rancho Grande specimens are *olivascens* in perfectly fresh plumage while all the other known specimens happen to be in worn plumage.

Whatever the ultimate decision, my present concern is with the birds only as migrants in north-central Venezuela.

On the night of June 14, 1945, a rail flew against the lighted windows of the laboratory and I picked it up from the grass outside quite dead. There was considerable fog and on the windows at the time were about two thousand moths.

Collection No. 30,422, Color Plate 1772, male, not breeding. Length 165 mm., wing 102, tail 34, culmen 23, tarsus 33 mm. Bill chartreuse green with scarlet base, feet dark peach red, iris scarlet orange. Body exceedingly fat. Food, small seeds of various kinds.

On the night of May 23 of the following year, 1946, a second rail of the same species came to the electric lights on the roof of Rancho Grande and was caught alive, killed and prepared. The night was fairly clear, except for thin clouds. Collection No. 30,722, male, near breeding, testes 7.5 mm. in length. Length 202 mm., wing 103, tail 38, culmen 22, tarsus 31 mm. Body exceedingly fat, weight 55.4 grams. Colors as in other bird except that the basal red on the maxilla extends dorsally to the anterior end of nostrils. Food, remains of weevils and flies.

The same evening four more rails, distinctly seen, struck the windows but even after an extended search in the darkness outside, no trace was found. Two days later, on May 25, at Portachuelo Pass in early morning, two of us saw a flock of several *Streptoprocne zonaris albicincta* and three *Progne chalybea chalybea* passing low going south. Immediately afterward a group of seventeen small, red-faced rails, appearing identical with the

one taken two days before, flew low overhead in the same direction headed toward Lake Valencia. They flew rather slowly as rails do and were perfectly distinct.

***Jacana jacana intermedia* (Sclater).**

Venezuelan Jacana.

Two of these birds were found on the Rancho Grande porch outside the laboratory about 9 o'clock on the evening of June 22. I caught one with a butterfly net and the other flew off into the rather thick fog. No. 30,783, female, largest ova 2.5 mm., gizzard full of small pieces of white quartz and remains of two small fish. Migrant-like, the bird was exceedingly fat, both in the body cavity and under the skin and along the oesophagus. Weight 111.5 grams. The labrets and maxilla as far as nostrils rich deep scarlet, rest of bill bright straw yellow, legs and feet pale green. A few white feathers on chin and upper throat.

***Charadrius collaris* (Vieillot).**

South American Collared Plover.

On June 25 we saw three of these birds, one apparently immature, feeding in the long grass at the roadside close to the Pass. They gave us several minutes of uninterrupted observation with glasses, and then rose together and flew straight down the gorge toward the sea. I have never before seen this species away from the coastal lowlands.

***Himantopus himantopus mexicanus* (Müller).**

Black-necked Stilt.

Four black-necked stilts flew through the Pass in bright sunshine, headed south, on May 21. They are frequently seen in pairs in the lowlands, both at Maracay and on the Turiamo and Ocumare sides.

***Leptotila verreauxi verreauxi* (Bonaparte).**

White-fronted Dove.

My only record of this bird in the daytime at rest, near Rancho Grande is a pair in a tree at the roadside in late afternoon of July 10. Yet a few kilometers down the road toward Maracay, at 700 and 800 meters elevation, they are often flushed from the road or seen in pairs perching in trees, at all times of the day.

We have five separate records of these doves dashing against the windows late in the evening on rainy or foggy nights. Three were caught and liberated after identification. The fifth was injured, so was killed and preserved. April 23, No. 30,650, female, not breeding, very fat, weight 132 grams. Three others were seen in the porch the same evening, and next morning a flock of about a dozen was counted going through the Pass northward. Circumstantial evidence, there

fore, would indicate that this was a local migration on the part of a bird which is widely resident in Venezuela.

***Oreopeleia montana montana* (Linnaeus).**

Ruddy Quail Dove.

This widely distributed species is rare at Rancho Grande. On only two occasions did I flush them. A pair the first time, and four doves the second, rose from the jungle floor along the water trail.

Four quail doves struck, late in the evening, against the windows of the laboratory. Two of these were caught. April 22, No. 30,649, female, not breeding, moderately fat, weight 99.5 grams. April 30, No. 30,671, male, breeding, testes 17 mm., fairly fat, weight 108.5 grams. Three days later, a trio of very red-backed doves flew through the Pass, which very likely were of this species.

***Cypseloides cryptus* (Zimmer).**

White-chinned Swift.

In 1945 a new species of swift was described.⁵ The type came from Rio Távora, Peru. Only four other specimens were known, taken at the following localities: British Guiana (Kaieteur Falls), Venezuela (Mt. Auyan-tepui, and Sororopán-tepui), and Costa Rica (San Pedro).

On April 20, 1946, a female of this swift crashed against the laboratory windows at Rancho Grande, at 8:30 in the evening, and was stunned. No. 30,634, female, not breeding, fairly fat, weight 40.2 grams. Length 120 mm., wing 137, tail 48, culmen 5.5, tarsus 16 and wing-spread 355 mm. The stomach was full of winged female *Azteca* ants.

On the following evening at the same time, April 21, a second bird killed itself against the identical window. No. 30,640, female, not breeding, considerable fat, weight 35.8 grams. Length 138 mm., wing 130, tail 50, culmen 5, and tarsus 15 mm. A great quantity of *Crematogaster* and *Azteca* flying ants in stomach. First primary in each wing half-grown. Mr. Phelps made the identification.

This wholly unexpected visitation only multiplies the mystery of the definite distribution of these birds. I do not know whether the Rancho Grande swifts were headed north or south, but it was in dense fog and rain. A migration of less or greater scope would be indicated by the nocturnal flight, fairly fat condition and absence of any other record during our stay.

***Pachyrampus polychopterus tristis* (Kaup).**

Glossy-crowned Becard.

My only records of this tropical species at

Rancho Grande are two males which struck against the laboratory windows during heavy rain and fog. April 18, 10 P. M., No. 30,631, male, near breeding, testes 7 mm., rather fat, weight 19.4 grams, in stomach a large berry and a small beetle. April 23, 9 o'clock, No. 30,651, male, near breeding, testes 6 mm., rather fat, weight 18.7 grams. This bird had the entire under plumage faintly freckled and lined with white. It can only be assumed that they were migrating at night from lowlands through the Pass to some other unknown lowland. They certainly were not resident at this altitude.

Other Records: Wetmore's nearest record for this cotinga is El Sombrero.

***Vireo olivaceus vividior* (Hellmayr and Seilern).**

Venezuelan Red-eyed Vireo.

On March 25 in heavy fog a male struck against the laboratory windows at 9:30 in the evening. No. 30,593, male, very fat, weight 14.5 grams, stomach empty. Iris pale reddish.

The next morning early, from my seat in Portachuelo Pass I watched near at hand seven red-eyed vireos feeding in the melanostomid bushes. They may have been the northern migrating form, *o. olivaceus*, but the earliest certain identification of these was on April 6. Or very likely they may have been in the same flight as the *vividior* of the previous night.

The resident red-eye in Venezuela is almost wholly tropical. The sudden presence in such numbers at this altitude, the nocturnal flight, extremely fat condition and empty stomach all suggest at least a local, transpass migration from lowland to lowland of the resident subspecies.

10. WANDERING.

Wandering may be thought a very indefinite term to be used in the present connection, but it might also prove a stage in the initiation of movements which in time would be more worthy of classification as migration.

***Fregata magnificens rothschildi* (Mathews).**

Caribbean Frigatebird.

These birds are always to be seen at Ocu-mare and it is likely that they nest on a small, offshore islet.

On August 7 and September 4 I sighted one and two frigatebirds respectively, high over Portachuelo Pass. Both days were free of cloud so these visitations were voluntary, and inspired by reasons clear only to the birds themselves.

⁵ Zimmer, John T., A New Swift from Central and South America. *The Auk*, 62: 1945, No. 4, pp. 586-592.

EXPLANATION OF THE PLATE.

PLATE I.

- Fig. 1. Portachuelo Pass, half hidden by mist, as seen from the courtyard of Rancho Grande.
- Fig. 2. Migrating male Blackpoll Warbler, *Dendroica striata* (Forster), in a window of the laboratory at Rancho Grande, on the evening of April 22. This was just before the bird took off in the fog and rain, on a trans-Caribbean flight, with objectives of Vermont, Labrador or northern Alaska.

Photographs by Miss Jocelyn Crane.



FIG. 1.



FIG. 2.

AVIAN MIGRATION AT RANCHO GRANDE IN NORTH-CENTRAL VENEZUELA.

